

Lesson 1: Getting Ready to Multiply (2 Days)

Getting Started

? Questions to Explore

- What are some strategies we can use to multiply and divide?



Facts and Definitions

- **Array:** an ordered arrangement of objects in equal rows and columns

⦿ Skills

- Skip count
- Use arrays to create addition sentences
- Identify equal groups

✂ Materials

- *The Grapes of Math* by Greg Tang
- abacus (kit)
- base-10 block cards (kit)
- colored pencils
- egg carton
- fine point dry-erase markers (kit)
- Interactive Notebook
- whiteboard (kit)

Introduction

This unit introduces your child to multiplication and division and focuses on the factors 2, 3, 4, 5, and 10. Your child will explore the relationship between multiplication and division and will begin to memorize his multiplication facts. In addition, he will complete occasional review activities focused on basic skills such as adding and subtracting to 1000, telling time, and counting money. While this unit introduces both multiplication and division, the main focus is on multiplication. Division will be addressed more fully during Unit 4.

Write the following number sentences vertically (top to bottom) on the whiteboard and ask your child to read them aloud:

- $55 + 30$
- $74 - 50$
- $350 + 70$
- $420 - 40$

For example, he should say "fifty-five plus thirty" for the first one. Now, ask him to explain what he knows about the numbers in each number sentence. He might tell how many digits each number has and which digits are in which places in each number. For example, for 350, he might say that the number has three digits and that the 3 is in the hundreds place, the 5 is in the tens place, and the 0 is in the ones place. Prompt him to provide this information as needed.

Once your child has had a chance to discuss each of the number sentences, give him time to find the sums and differences. (85, 24, 420, 380) Allow him to use materials such as the base-10 blocks card or the abacus as needed, and encourage him to use the math strategies that he already knows to find the answers. For example, he can add and subtract the ones places first and then use carrying or borrowing as needed. Give

him time to correct any mistakes. For a review of some math strategies from previous units, see the "Math Strategies Review" sheets, and review the strategies with your child as needed. Store these sheets in your child's Interactive Notebook for future reference as needed.

Now, say, "You've already worked with addition and subtraction, and you know how to add and subtract numbers all the way up to 1000. During this unit, you're going to learn about two more mathematical operations that we use in our daily lives. Before you get into these operations, though, you'll review some skills that will help you better understand them."

Activities

Activity 1: Skip Counting

Give your child the "Skip Counting" activity pages. Ask him to carefully follow the instructions on the activity pages, which ask him to use information and complete practice activities found at the following web link. (For example, for Question #1, he will read the information at the top of the webpage and then answer the question. For #2, he will read a section on the webpage, click the specified link, and then complete the exercise that displays.) He will complete some tasks on the website and others on the activity pages. Encourage him to complete the questions in the order outlined on the activity pages. Assist him as needed in following the instructions on the "Skip Counting" pages and navigating the website.

Tell him that while he already knows much of the information provided in this activity, the additional practice will help him as he moves forward with new information and skills. Note: Allow him to use an abacus as needed when he gets to Question #7.



Skip Counting

www.beyondthepage.com/link/6266/

The two "Skip Counting" pages provide instructions on what information to read and what practice activities to complete on this website.

Answer Key:

- 1) to count things more quickly, to help with multiplication
- 5) 0, 3, 6, 9, 12, 15, 18, 21, 24
What number will come next if you continue to count by 3? 27
- 6) 0, 4, 8, 12, 16, 20, 24
What number will come next if you continue to count by 4? 28

Activity 2: Skip Counting Patterns on the Number Grid

Your child will complete the "Skip Counting Patterns" sheets by coloring the numbers that he comes to when he counts by the number specified on each sheet. For example, on the "Skip Counting by 3" sheet, he will color the numbers that he comes to as he counts by 3 starting at 3: 3, 6, 9, 12, 15, 18, 21, 24, and so forth to 100. Tell him to choose a different color for each sheet. Before he begins working, ask, "On which sheet do you think you'll color the most numbers?" and "On which sheet do you think you'll color the fewest numbers?" Ask him to explain his thinking.

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If needed, ask him to show you how he will count up on the number grid, and make sure that he begins counting right after the last number and then counts the correct number of spaces (corresponding to the target number). Encourage him to work slowly and carefully so that he colors the correct numbers on each sheet.

Once he's finished coloring each number grid, he should store them in his Interactive Notebook.

"Skip Counting Patterns" Answer Key

Skip Counting by 3

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

Skip Counting by 4

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

Skip Counting by 6

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

Skip Counting by 7

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

Skip Counting by 8

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

Skip Counting by 9

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

Day 2

Activity 3: Arrays and Repeated Addition

Show your child an egg carton that has space for 12 eggs. Open the carton, and say, "An egg carton is a good example of an array. An **array** shows a number of objects in a set arrangement of rows and columns. The rows go across, and the columns go down. How many rows and columns does this carton have?" (2 rows, 6 columns) Explain that we call this a 2 by 6 array and that it shows the number 12. As you point to the rows and columns, say, "This array shows that we can make 12 by adding 6 groups of 2. We can also make 12 by adding 2 groups of 6." (Turn the egg carton to show this array.) Give your child the whiteboard and a dry-erase marker, and ask him to write two addition sentences for the egg carton array. Ask, "How can you show addition using this array?" He should write $2+2+2+2+2+2=12$ and $6+6=12$.

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Now, write $4+4+4$ on the whiteboard, and ask your child to draw an array of dots to show it. He should draw either 3 rows of 4 dots or 4 rows of 3 dots. Ask, "What's the sum of $4+4+4$?" (12) Explain to him that arrays help us model repeated addition and that he will be using them to model another operation in coming lessons.

If your child needs additional practice with arrays and matching addition sentences to them, give him time to answer the questions at the following web link.



Arrays and Repeated Addition

www.beyondthepage.com/link/6267/

Your child will complete the "Arrays and Repeated Addition" sheet by first writing addition sentences for the given arrays and then creating arrays and addition sentences to show a sum of 24.

Answer Key:

- Box 1: $5+5+5=15$ and $3+3+3+3+3=15$
- Box 2: $4+4+4+4+4=20$ and $5+5+5+5=20$

"Arrays and Repeated Addition" Answer Key

1  2×12	2  12×2	3  3×8
4  8×3	5  4×6	6  6×4

Instructions: Write the addition sentences for each of your arrays below:

- | | |
|---|---------------------------------------|
| 1. <u>$2+2+2+2+2+2+2+2+2+2+2+2=24$</u> | 4. <u>$8+8+8=24$</u> |
| 2. <u>$12+12=24$</u> | 5. <u>$4+4+4+4+4+4=24$</u> |
| 3. <u>$3+3+3+3+3+3+3+3=24$</u> | 6. <u>$6+6+6+6=24$</u> |

Activity 4: Equal Groups

Say, "Imagine that I need to make gloves for 8 people, so I need to know how many hands 8 people have. How might I figure that out?" Give your child the whiteboard and a dry-erase marker, and let him try to

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determine the answer. He may draw a picture (for example, of hands) or a diagram (such as an array) or he may write numbers to come up with the sum (16). When he's finished, ask him to explain how he found it.

Now, give him the "Equal Groups" sheet, and tell him to list things that always come in groups of the given numbers. He should write his ideas in the spaces provided. To help him get started, pose the following types of questions and examples as needed:

- What else, besides hands, come in groups of 2? (eyes, ears, socks, twins)
- What comes in groups of 3? (sides of a triangle, wheels on a tricycle, triplets)
- Can you think of something that comes in groups of 4? (legs on a horse, sides on a square, wheels on a car)
- How might you use what you know about time and money to come up with some ideas? (for example, a nickel is 5 pennies)
- What are some things that you know about different animals that will help you come up with ideas? (for example, an octopus has 8 arms)

If your child needs more support to come up with ideas for the given numbers, allow him to search online by entering "things that come in groups of ____" (insert one of the target numbers). When he's finished with this sheet, he can store it in his Interactive Notebook for use in Lesson 2.

Wrapping Up

Show your child the book *The Grapes of Math* by Greg Tang, and explain that this book presents a variety of math riddles that can be solved in different ways. Say, "Today, we're going to look at the first two riddles only. In the future, you'll try to solve some riddles on your own."

Begin with the first riddle, "Fish School." Read the riddle aloud, and ask, "How might you figure out how many fish there are without counting them?" As needed, explain that "askew" means "not straight." Turn the page as needed, and ask, "Do you see an array?" Give your child a chance to use the array to figure out how many fish there are. Provide help by asking, "What addition facts do you know that can help you with this repeated addition?" For example, if he knows $4+4$ and $8+8$, he may be able to figure out that there are 16 fish on the page.

Now, turn to the second riddle, "The Grapes of Math," and ask, "How might you use what you know about equal groups to figure out how many grapes are on this page?" and, if needed, "Is there a way to group these groups of grapes to create equal groups?" Your child should find that the grapes can be grouped in clusters of 10 (adding 7 grapes and 3 grapes), for a total of 5 groups or 50 grapes.

Solutions are provided in the back of the book.

Learning Gates

Have your child take the [Learning Gates quiz](#) for this lesson.

Math Strategies Review

Addition Strategies

The Commutative Property of Addition

Turn-around facts

example

$$5 + 3 = 8$$

$$3 + 5 = 8$$

Doubles

Adding a number to itself

example

$$3 + 3 = 6$$

$$4 + 4 = 8$$

Doubles Plus 1

If I know the double, then this is easy!

example

$$3 + 3 = 6$$

$$\text{So } 3 + 4 = 7$$

Making 10s

What numbers make 10?

example

$$3 + 7 = 10$$

$$6 + 4 = 10$$

Fact Families

Some numbers belong together!

example

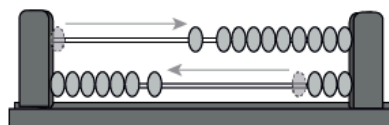
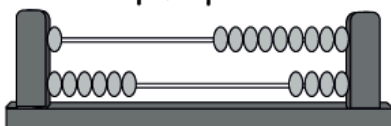
$$2 + 8 = 10 \quad 10 - 8 = 2$$

$$8 + 2 = 10 \quad 10 - 2 = 8$$

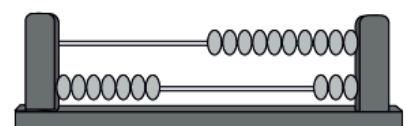
Adding Nines

Nine really wants to be ten!

$$9 + 4 =$$



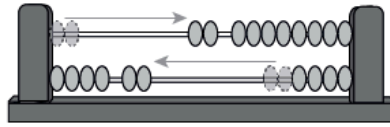
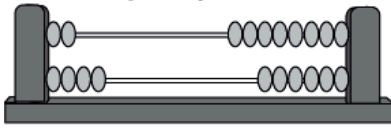
$$10 + 3 = 13$$



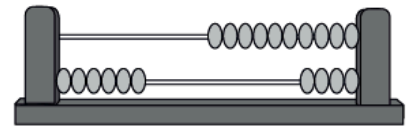
Adding Eights

Eight really wants to be ten, too!

$$8 + 6 =$$



$$10 + 4 = 14$$



Subtraction Strategies

Neighbors

Numbers that are close to each other...

example

$$6 - 5 = 1$$

$$8 - 6 = 2$$

Half Facts

Using what you know about doubles!

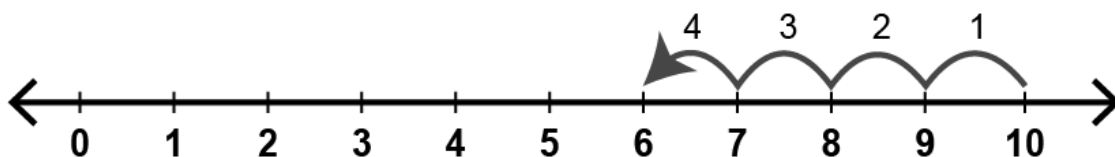
example

$$8 - 4 = 4$$

Counting Back

Start at the bigger number and count back to the smaller number.

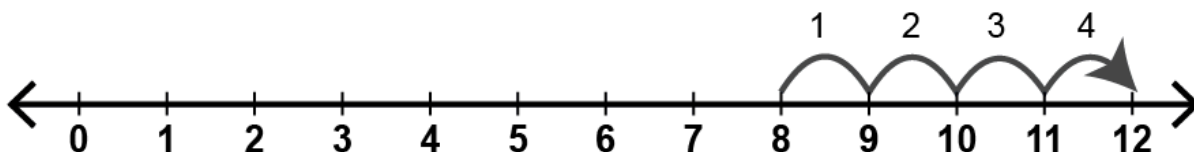
$$10 - 4 = 6$$



Counting Up

Start at the smaller number and count up to the bigger number.

$$12 - 8 = 4$$



Working With Big Numbers

Adding – Composing 10

Add the ones place.

$$\begin{array}{r} 198 \\ + 117 \\ \hline \end{array}$$

(8 + 7 = 15)

$$\begin{array}{r} 198 \\ + 117 \\ \hline 5 \end{array}$$

Add the tens place

$$\begin{array}{r} 198 \\ + 117 \\ \hline 5 \end{array}$$

(1 + 9 + 1 = 11)

$$\begin{array}{r} 198 \\ + 117 \\ \hline 15 \end{array}$$

Add the hundreds place

$$\begin{array}{r} 198 \\ + 117 \\ \hline 315 \end{array}$$

Subtracting – Borrowing

Look at the ones place.
Is the number on top more or less than the number on the bottom?

$$\begin{array}{r} 342 \\ - 167 \\ \hline \end{array}$$

Since 2 is less than 7 we need to borrow from our neighbor.

$$\begin{array}{r} 342 \\ - 167 \\ \hline \end{array}$$

Now you can subtract the ones place (12 - 7 = 5)

$$\begin{array}{r} 342 \\ - 167 \\ \hline 5 \end{array}$$

Subtract the tens place next. Repeat the steps for borrowing if necessary. (13 - 6 = 7)

$$\begin{array}{r} 342 \\ - 167 \\ \hline 75 \end{array}$$

Subtract the hundreds place.

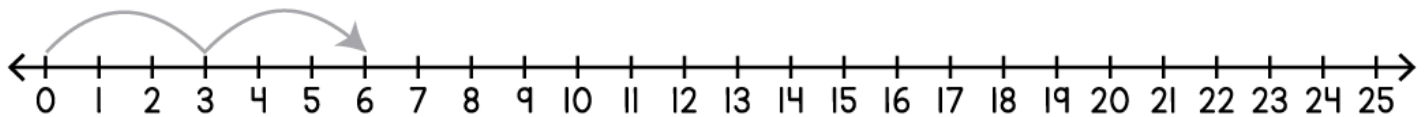
$$\begin{array}{r} 342 \\ - 167 \\ \hline 175 \end{array}$$

Skip Counting

Instructions: Be sure to complete the following activities in the specified order. Read the directions on this sheet and then proceed to the web page.

1. Read the information at the top of the web page and stop at "Skip Counting by 10s." Why is it important to learn to skip count?

2. Read "Skip Counting by 10s" and then click the link for "Practice: Skip Counting by 10s to 300." Complete the activity on that page.
3. Click "Skip Counting Index" in the upper right hand corner to return to the main page. Read "Skip Count by 2" and complete the demonstrations that come before the practice in that section. Click the "Practice: Skip Counting by 2s to 100" link and complete the activity on that page.
4. Click "Skip Counting Index" in the upper right hand corner to return to the main page. Read "Skip Counting by 5s" and complete both practice activities there. (After each one, click "Skip Counting Index" in the upper right hand corner to return to the main page.)
5. Before continuing at the website, show how to skip count by 3 by going as high as you can on the number line below. Draw arrows like the ones provided to show how to count up by 3.

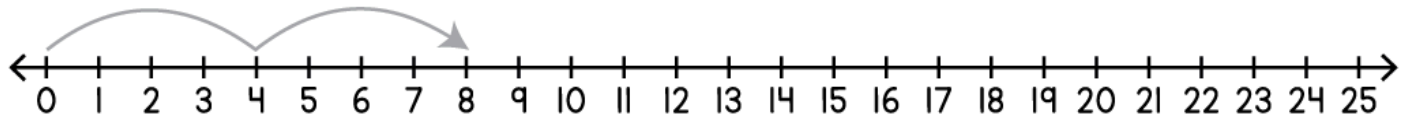


When you count by 3 from 0 to 25, what numbers do you come to? Fill in the blanks below:

0, 3, 6, _____, _____, _____, _____, _____, _____

What number will come next if you continue to count by 3? _____

6. Now, show how to skip count by 4 on the number line below.

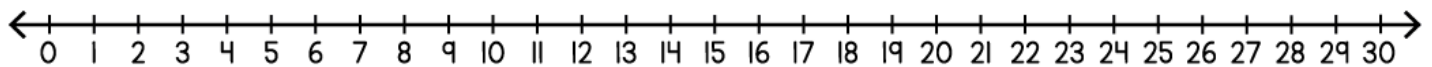


When you count by 4 from 0 to 25, what numbers do you come to? Fill in the blanks below:

0, 4, 8, _____, _____, _____, _____, _____

What number will come next if you continue to count by 4? _____

7. Complete all four activities in the “Skip Counting by 3s and 4s” section on the web page. Feel free to use the abacus as you work, adding 3 or 4 beads at a time depending on which number you are skip counting by. After each activity, click “Skip Counting Index” in the upper right hand corner to return to the main page.
8. Now, complete all of the “Skip Counting Backwards” activities. Use what you know about number patterns when you count by 2, 5, and 10.
9. Ask your parent to call out a number: 2, 3, 4, 5, or 10. Use the number line below and your finger to skip count forward by that number, and then skip count backwards by that same number. Repeat with at least two other numbers.



10. Challenge!



Choose a number (2, 3, 4, 5, or 10). Type your number into a calculator and then skip count in your head by that number to determine the next number in the pattern. To see if you are correct, press the **+** sign, then the original number, and then the **=** button. Repeat by skip counting in your head to figure out the next number and then checking your answer on the calculator. How high can you go?

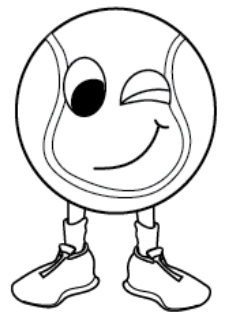
EXAMPLE:

My number: 5

5	+	5	=	10
10	+	5	=	15
15	+	5	=	20

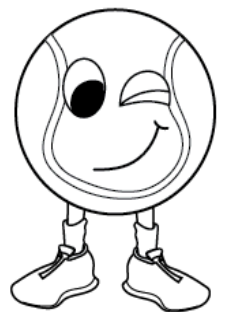
Skip Counting by 3

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
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91	92	93	94	95	96	97	98	99	100



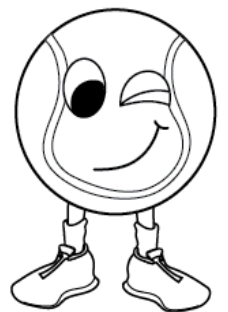
Skip Counting by 4

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100



Skip Counting by 6

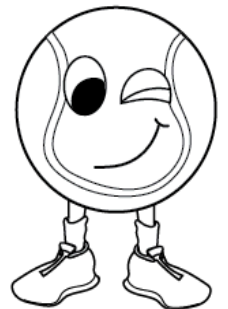
1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100



Skip Counting by



1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100



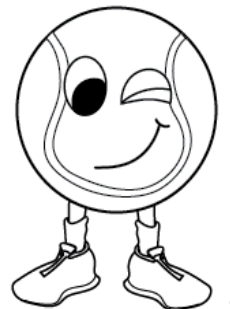
Skip Counting by 8

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100



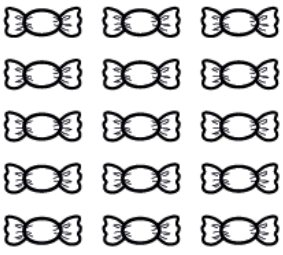
Skip Counting by 9

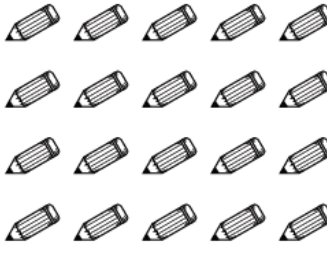
1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100



Arrays and Repeated Addition

Instructions: Write two addition sentences for each array.





Instructions: How many different arrays can you make to show a sum of 24? Draw them here:

1	2	3
4	5	6

Instructions: Write the addition sentences for each of your arrays below:

1. _____

4. _____

2. _____

5. _____

3. _____

6. _____

Equal Groups

2	3	4
5	8	10